

TB-FMCH-FMC2SMA Hardware User Manual

Rev.1.00

Revision History

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Introduction

Thank you for purchasing the **TB-FMCH-FMC2SMA** board. Before using the product, be sure to carefully read this user manual and fully understand how to correctly use the product. First read through this manual, then always keep it handy.

SAFETY PRECAUTIONS

Be sure to observe these precautions

Observe the precautions listed below to prevent injuries to you or other personnel or damage to property.

- Before using the product, read these safety precautions carefully to assure correct use.
- These precautions contain serious safety instructions that must be observed.
- After reading through this manual, be sure to always keep it handy.

The following conventions are used to indicate the possibility of injury/damage and classify precautions if the product is handled incorrectly.

 Danger	Indicates the high possibility of serious injury or death if the product is handled incorrectly.
 Warning	Indicates the possibility of serious injury or death if the product is handled incorrectly.
 Caution	Indicates the possibility of injury or physical damage in connection with houses or household goods if the product is handled incorrectly.

The following graphical symbols are used to indicate and classify precautions in this manual.
(Examples)

	Turn off the power switch.
	Do not disassemble the product.
	Do not attempt this.



Warning

	In the event of a failure, disconnect the power supply. If the product is used as is, a fire or electric shock may occur. Disconnect the power supply immediately and contact our sales personnel for repair.
	If an unpleasant smell or smoking occurs, disconnect the power supply. If the product is used as is, a fire or electric shock may occur. Disconnect the power supply immediately. After verifying that no smoking is observed, contact our sales personnel for repair.
	Do not disassemble, repair or modify the product. Otherwise, a fire or electric shock may occur due to a short circuit or heat generation. For inspection, modification or repair, contact our sales personnel.
	Do not touch a cooling fan. As a cooling fan rotates in high speed, do not put your hand close to it. Otherwise, it may cause injury to persons. Never touch a rotating cooling fan.
	Do not place the product on unstable locations. Otherwise, it may drop or fall, resulting in injury to persons or failure.
	If the product is dropped or damaged, do not use it as is. Otherwise, a fire or electric shock may occur.
	Do not touch the product with a metallic object. Otherwise, a fire or electric shock may occur.
	Do not place the product in dusty or humid locations or where water may splash. Otherwise, a fire or electric shock may occur.
	Do not get the product wet or touch it with a wet hand. Otherwise, the product may break down or it may cause a fire, smoking or electric shock.
	Do not touch a connector on the product (gold-plated portion). Otherwise, the surface of a connector may be contaminated with sweat or skin oil, resulting in contact failure of a connector or it may cause a malfunction, fire or electric shock due to static electricity.

**Caution****Do not use or place the product in the following locations.**

- Humid and dusty locations
- Airless locations such as closet or bookshelf
- Locations which receive oily smoke or steam
- Locations exposed to direct sunlight
- Locations close to heating equipment
- Closed inside of a car where the temperature becomes high
- Sticky locations
- Locations close to water or chemicals

Otherwise, a fire, electric shock, accident or deformation may occur due to a short circuit or heat generation.

**Do not place heavy things on the product.**

Otherwise, the product may be damaged.

■ Disclaimer

This product is a board intended for **SMA** Connectors. Tokyo Electron Device Limited assumes no responsibility for any damages resulting from the use of this product for purposes other than those stated.

Even if the product is used properly, Tokyo Electron Device Limited assumes no responsibility for any damages caused by:

- (1) Earthquake, thunder, natural disaster or fire resulting from the use beyond our responsibility, acts by a third party or other accidents, the customer's willful or accidental misuse or use under other abnormal conditions.
- (2) Secondary impact arising from use of this product or its unusable state (business interruption or others)
- (3) Use of this product against the instructions given in this manual.
- (4) Malfunctions due to connection to other devices.

Tokyo Electron Device Limited assumes no responsibility or liability for:

- (1) Erasure or corruption of data arising from use of this product.
- (2) Any consequences or other abnormalities arising from use of this product, or
- (3) Damage of this product not due to our responsibility or failure due to modification

This product has been developed by assuming its use for research, testing or evaluation. It is not authorized for use in any system or application that requires high reliability.

Repair of this product is carried out by replacing it on a chargeable basis, not repairing the faulty devices. However, non-chargeable replacement is offered for initial failure if such notification is received within two weeks after delivery of the product.

The specification of this product is subject to change without prior notice.

The product is subject to discontinuation without prior notice.

1. Related Documents and Accessories

Related documents:

All documents relating to this board can be downloaded from our website. Please see attached paper on the products.

Board accessories:

- FMC spacer set

2. Overview

This board provides SMA connectors via FMC(HPC) connector.

It connect to FMC(HPC) connector with FPGA hi-speed SERDES.

Notice:

SMA connects FPGA hi-speed SERDES interface and reference clock.

FPGA standard IO is not connects.

3. Feature

FMC Connector: HPC(Samtec)

SMA connectors:142-0711-201 (Emerson)

Clock: On board 156.25MHz and SMA connectors for FPGA Reference clock input

4. Block Diagram

Following Figure is block diagram of TB-FMCH-FMC2SMA

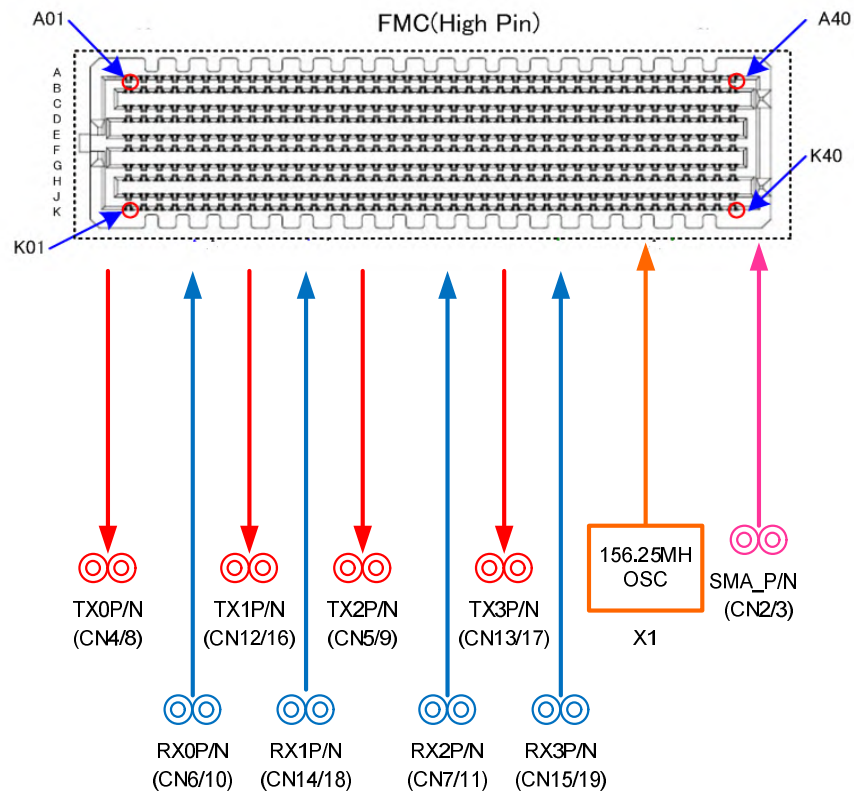


Figure 4-1 Block Diagram

5. External View of the Board

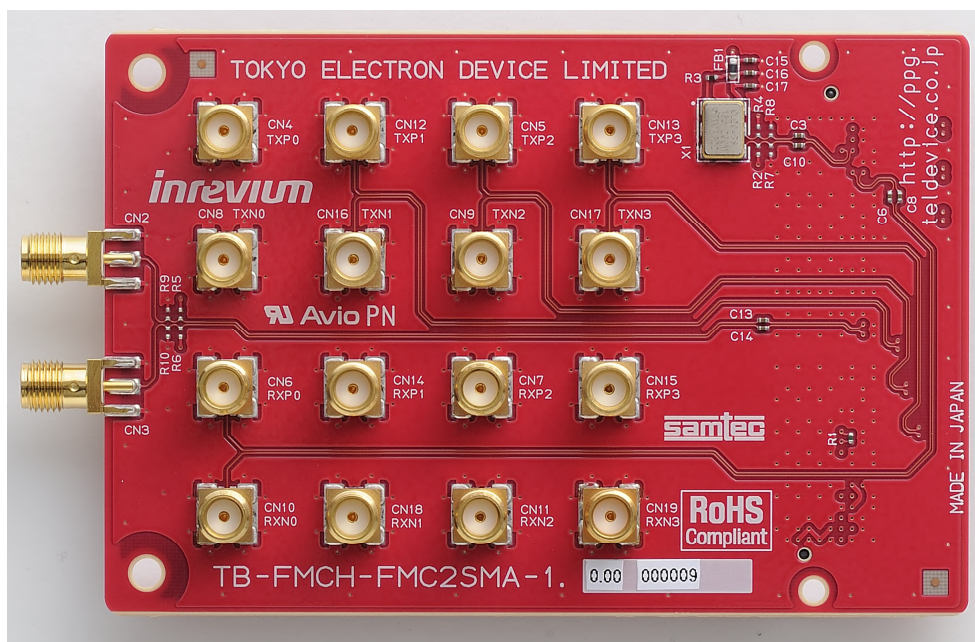


Figure 5-1 Component Side

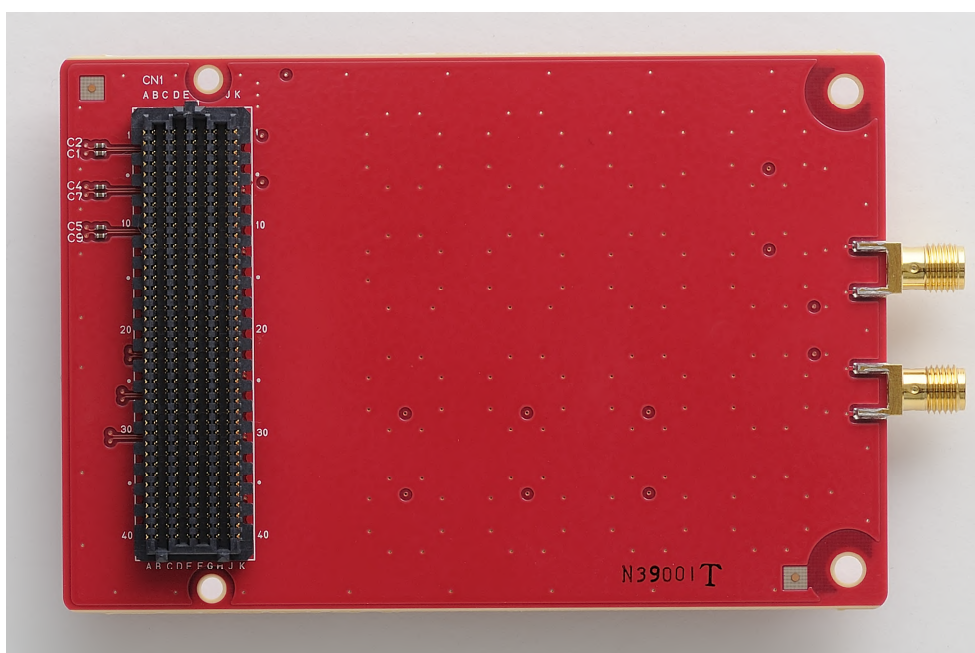


Figure 5-2 Solder Side

6. Board Specifications

Figure 6-1 shows the board specifications.

External Dimensions: 102 mm (W) x 69 mm (H)

Number of Layers: 6 layers

Board Thickness: 1.6 mm

Material: MEG6

FMC Connector: Samtec ASP-134488-01

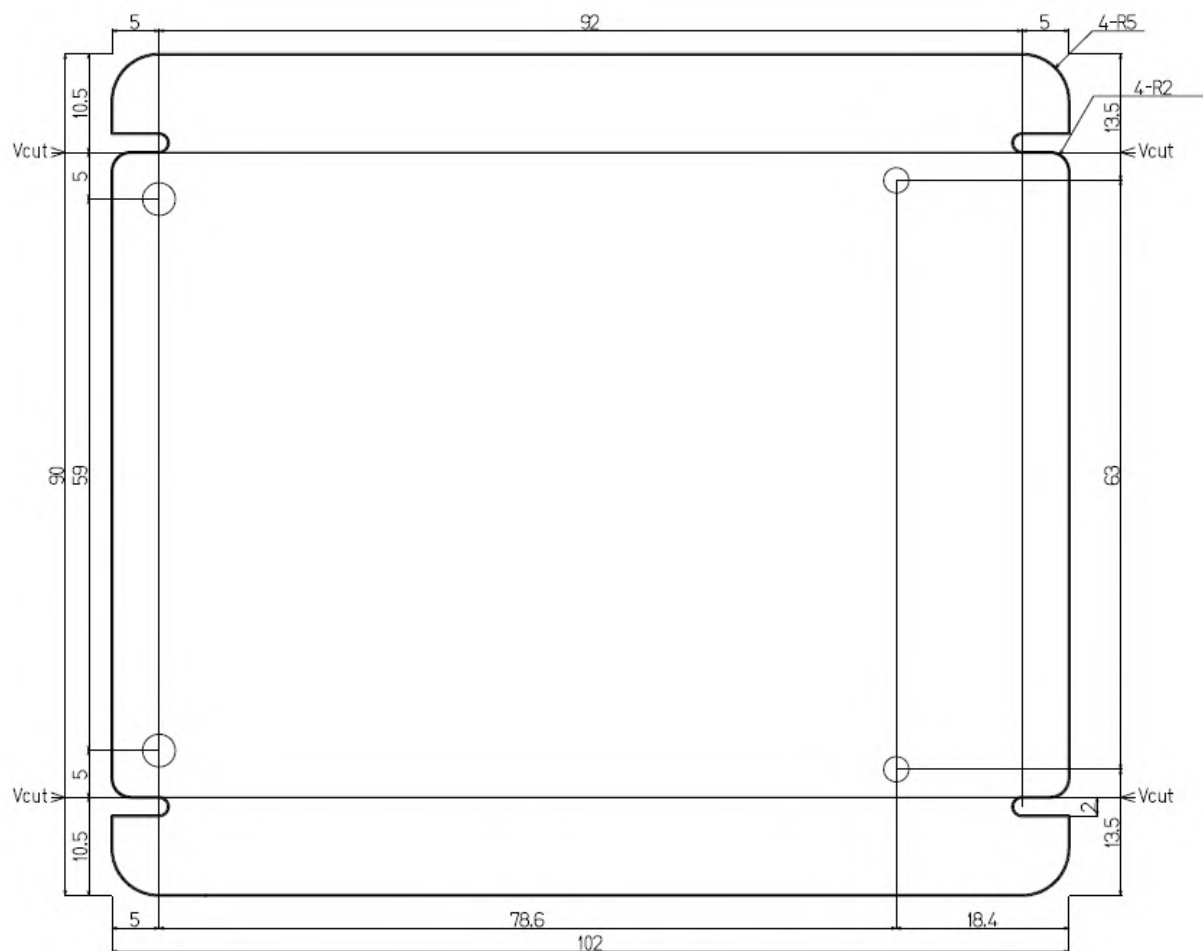


Figure 6-1 Board Dimensions (inclusive of wastable substrate)

7. Description of Components

7.1. SMA Connectors

SMA connectors are connecting FPGA hi-speed SERDES via FMC connector.

On the Board, SMA connectors have a reference number and TX, RX or Positive, Negative silk print.

0.1uF, AC coupling capacitor is on between SMA and FMC connector. Please refer to the schematic

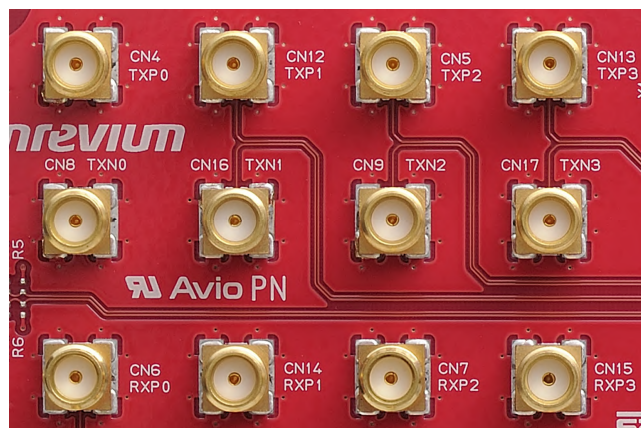


Figure 7-1 SMA on board silk print

Table 7-1 SMA signals connection

SMA Side CN No.	Signal Name	FMC Side	
		Pin No.	FMC Pin Name
CN4	DP_C2M_P0(TXP0)	C2	DP0_C2M_P
CN8	DP_C2M_N0(TXN0)	C3	DP0_C2M_N
CN12	DP_C2M_P1(TXP1)	A22	DP1_C2M_P
CN16	DP_C2M_N1(TXN1)	A23	DP1_C2M_N
CN5	DP_C2M_P2(TXP2)	A26	DP2_C2M_P
CN9	DP_C2M_N2(TXN2)	A27	DP2_C2M_N
CN13	DP_C2M_P3(TXP3)	A30	DP3_C2M_P
CN17	DP_C2M_N3(TXN3)	A31	DP3_C2M_N
CN6	DP_M2C_P0(RXP0)	C6	DP0_M2C_P
CN10	DP_M2C_N0(RXN0)	C7	DP0_M2C_N
CN14	DP_M2C_P1(RXP1)	A2	DP1_M2C_P
CN18	DP_M2C_N1(RXN1)	A3	DP1_M2C_N
CN7	DP_M2C_P2(RXP2)	A6	DP2_M2C_P
CN11	DP_M2C_N2(RXN2)	A7	DP2_M2C_N
CN15	DP_M2C_P3(RXP3)	A10	DP3_M2C_P
CN19	DP_M2C_N3(RXN3)	A11	DP3_M2C_N

7.2. On board Clock Circuit

This board has an oscillator and SMA connector for input user clock.

0.1uF, AC coupling capacitor is on between SMA and FMC connector. Please refer to the schematic

Table 7-2 Connection of clock signals

Signal Name	FMC Side		Note
	Pin No.	FMC Pin Name	
GBTCLK0_M2C_P	D4	GBTCLK0_M2C_P	Oscillator
GBTCLK0_M2C_N	D5	GBTCLK0_M2C_N	Oscillator
GBTCLK1_M2C_P	B20	GBTCLK1_M2C_P	SMA Connector
GBTCLK1_M2C_N	B21	GBTCLK1_M2C_N	SMA Connector

8. Appendix

	K	J	H	G	F	E	D	C	B	A
1	VREF_B M2C	GND	VREF_A M2C	GND	PG M2C	GND	PG C2M	GND	RES1	GND
2	GND	CLK3 M2C P	PRSNT M2C L	CLK1 M2C P	GND	HA01 P CC	GND	DP0 C2M P	GND	DP1 M2C P
3	GND	CLK3 M2C N	GND	CLK1 M2C N	GND	HA01 N CC	GND	DP0 C2M N	GND	DP1 M2C N
4	CLK2 M2C P	GND	CLK0 M2C P	GND	HA00 P CC	GND	GBTCLK0 M2C P	GND	DP9 M2C P	GND
5	CLK2 M2C N	GND	CLK0 M2C N	GND	HA00 N CC	GND	GBTCLK0 M2C N	GND	DP9 M2C N	GND
6	GND	HA03 P	GND	LA00 P CC	GND	HA05 P	GND	DP0 M2C P	GND	DP2 M2C P
7	HA02 P	HA03 N	LA02 P	LA00 N CC	HA04 P	HA05 N	GND	DP0 M2C N	GND	DP2 M2C N
8	HA02 N	GND	LA02 N	GND	HA04 N	GND	LA01 P CC	GND	DP8 M2C P	GND
9	GND	HA07 P	GND	LA03 P	GND	HA09 P	GND	LA01 N CC	GND	DP8 M2C N
10	HA06 P	HA07 N	LA04 P	LA03 N	HA08 P	HA09 N	GND	LA06 P	GND	DP3 M2C P
11	HA06 N	GND	LA04 N	GND	HA08 N	GND	LA05 P	LA06 N	GND	DP3 M2C N
12	GND	HA11 P	GND	LA08 P	GND	HA13 P	LA05 N	GND	DP7 M2C P	GND
13	HA10 P	HA11 N	LA07 P	LA08 N	HA12 P	HA13 N	GND	GND	DP7 M2C N	GND
14	HA10 N	GND	LA07 N	GND	HA12 N	GND	LA09 P	LA10 P	GND	DP4 M2C P
15	GND	HA14 P	GND	LA12 P	GND	HA16 P	LA09 N	LA10 N	GND	DP4 M2C N
16	HA17 P CC	HA14 N	LA11 P	LA12 N	HA15 P	HA16 N	GND	GND	DP6 M2C P	GND
17	HA17 N CC	GND	LA11 N	GND	HA15 N	GND	LA13 P	GND	DP6 M2C N	GND
18	GND	HA18 P	GND	LA16 P	GND	HA20 P	LA13 N	LA14 P	GND	DP5 M2C P
19	HA21 P	HA18 N	LA15 P	LA16 N	HA19 P	HA20 N	GND	LA14 N	GND	DP5 M2C N
20	HA21 N	GND	LA15 N	GND	HA19 N	GND	LA17 P CC	GND	GBTCLK1 M2C P	GND
21	GND	HA22 P	GND	LA20 P	GND	HB03 P	LA17 N CC	GND	GBTCLK1 M2C N	GND
22	HA23 P	HA22 N	LA19 P	LA20 N	HB02 P	HB03 N	GND	LA18 P CC	GND	DP1 C2M P
23	HA23 N	GND	LA19 N	GND	HB02 N	GND	LA23 P	LA18 N CC	GND	DP1 C2M N
24	GND	HB01 P	GND	LA22 P	GND	HB05 P	LA23 N	GND	DP9 C2M P	GND
25	HB00 P CC	HB01 N	LA21 P	LA22 N	HB04 P	HB05 N	GND	GND	DP9 C2M N	GND
26	HB00 N CC	GND	LA21 N	GND	HB04 N	GND	LA26 P	LA27 P	GND	DP2 C2M P
27	GND	HB07 P	GND	LA25 P	GND	HB09 P	LA26 N	LA27 N	GND	DP2 C2M N
28	HB06 P CC	HB07 N	LA24 P	LA25 N	HB08 P	HB09 N	GND	GND	DP8 C2M P	GND
29	HB06 N CC	GND	LA24 N	GND	HB08 N	GND	TCK	GND	DP8 C2M N	GND
30	GND	HB11 P	GND	LA29 P	GND	HB13 P	TDI	SCL	GND	DP3 C2M P
31	HB10 P	HB11 N	LA28 P	LA29 N	HB12 P	HB13 N	TDO	SDA	GND	DP3 C2M N
32	HB10 N	GND	LA28 N	GND	HB12 N	GND	3P3VALUX	GND	DP7 C2M P	GND
33	GND	HB15 P	GND	LA31 P	GND	HB19 P	TMS	GND	DP7 C2M N	GND
34	HB14 P	HB15 N	LA30 P	LA31 N	HB16 P	HB19 N	TRST L	GA0	GND	DP4 C2M P
35	HB14 N	GND	LA30 N	GND	HB16 N	GND	GA1	12P0V	GND	DP4 C2M N
36	GND	HB18 P	GND	LA33 P	GND	HB21 P	3P3V	GND	DP6 C2M P	GND
37	HB17 P CC	HB18 N	LA32 P	LA33 N	HB20 P	HB21 N	GND	12P0V	DP6 C2M N	GND
38	HB17 N CC	GND	LA32 N	GND	HB20 N	GND	3P3V	GND	GND	DP5 C2M P
39	GND	VIO_B M2C	GND	VADJ	GND	VADJ	GND	3P3V	GND	DP5 C2M N
40	VIO_B M2C	GND	VADJ	GND	VADJ	GND	3P3V	GND	RES0	GND

LPC Connector

LPC Connector

LPC Connector

LPC Connector

Figure 8-1 FMC(HPC) Pin Assign



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